Goshen Center for Cancer Care

Comprehensive. Cutting-edge. Close.

Benefits of targeted radiation therapy

Oncology Team

Dr. Leonard Henry
Medical Director
Surgical Oncologist

Dr. Bolanle Adepoju
Medical Oncologist

Dr. Fiona Denham
Breast Surgical Oncologist

Dr. Ashley Hardy
Surgical Oncologist

Dr. Yaser Kawar
Pulmonologist

Dr. Ebenezer Kio
Medical Oncologist

Dr. Shelia Manning
Naturopathic Doctor

Dr. Emily Moore
Naturopathic Doctor

Dr. Laura Morris
Breast Surgical Oncologist

Dr. Irina Sparks
Radiation Oncologist

Dr. Pamela Stone
Gynecologic Oncologist

Dr. Houman Vaghefi
Radiation Oncologist

Dr. Urs von Holzen
Surgical Oncologist

Dr. James Wheeler
Radiation Oncologist

Ingrid Bowser, NP

Bo Coody, NP

Grace Darnell, NP

Kristan Rheinheimer, NP

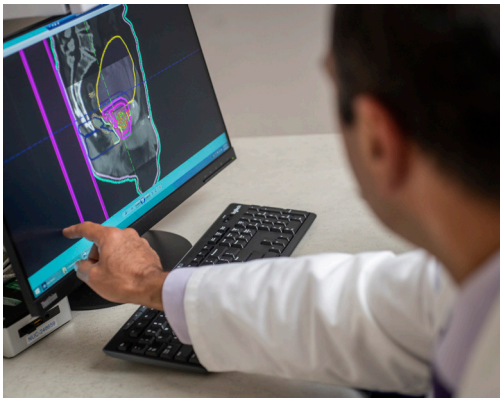
Marlise Webber, NP

Cathy Wesson, NP

Alyssa Yoder, NP

Tracy Paulus
Certified Tumor Registrar

To refer a patient to Goshen Center for Cancer Care, call (574) 364-2973.



By Houman Vaghefi, MD, PhD

Minimizing side effects, shortening length of treatment, improving outcomes and reducing costs for patients across a wide range of cancers

Radiation therapy has long been one of the primary effective treatments for a variety of cancers. But new forms of radiation treatment have emerged. Depending on the patient's situation, these new treatments can offer a wide range of benefits.

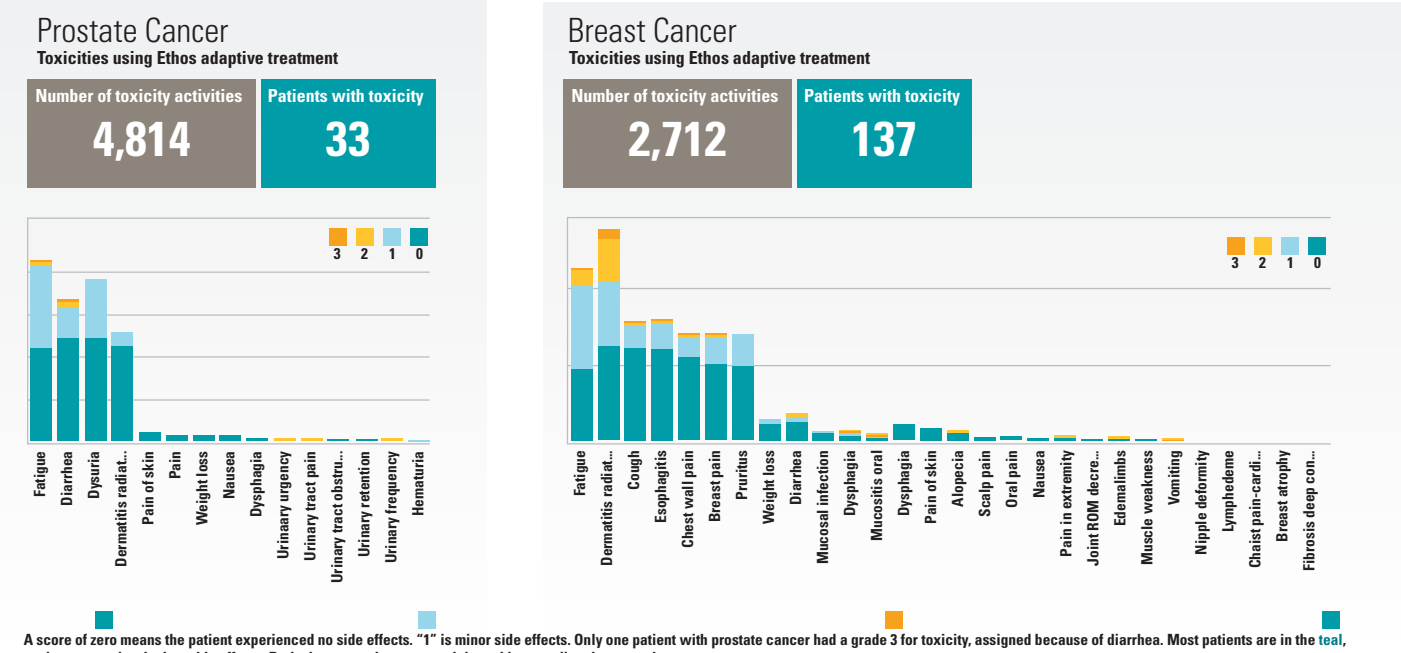
In the past, radiation therapy involved a regimen of multiple applications over several weeks or months. In the right circumstances, however, we can now initiate a stereotactic treatment program that shortens the process dramatically. In some cases, this may mean as little as one treatment and seldom more than five treatment sessions.

Stereotactic radiosurgery is the cornerstone

This shortening of the process helps minimize the potential for troubling side effects, reduces the cost of treatment and has demonstrably improved outcomes. It is delivered through stereotactic radiosurgery, a non-surgical therapy that delivers high doses of radiation targeted precisely to the tumor.

Decisions about the appropriate treatment modality are made by Goshen Center for Cancer Care's multidisciplinary tumor board, in collaboration with the patient's PCP and any other specialists who may be involved in the case.

When appropriate, targeted radiation treatment is delivered within or next to the tumor with brachytherapy. The precise radiation is injected in appropriate intensity using image-guided computer mapping technology. Such precise targeting reduces the likelihood of injury to surrounding parts of the body and enhances cure-rate outcomes. An example of the technology available for administering this treatment is the center's Ethos™ Therapy equipment. Ethos is an adaptive therapeutic device that utilizes artificial intelligence and machine learning to create and adapt plans for physicians' review in minutes. Ethos is one of the center's three technological devices for targeted radiation treatment.



A score of zero means the patient experienced no side effects. "1" is minor side effects. Only one patient with prostate cancer had a grade 3 for toxicity, assigned because of diarrhea. Most patients are in the teal, so that means they had no side effects. Both doctors and nurses participated in recording these results.

Targeted therapy can be utilized for urologic and many other cancers

As noted, stereotactic therapy is applicable to a wide range of cancers including prostate, colorectal, cervical, breast and many others – including urologic. The versatility of this treatment is one of its most valuable features, but it may not always be top-of-mind when radiation is being considered for patients with some of these other cancers.

IORT supplements localized surgery

There are, of course, differences in these cancer types that require supplementary treatment. For example, a subset of patients such as those with rectal cancer or sarcoma may be treated with a localized surgery. Based on the assessment of our multidisciplinary tumor board, intraoperative radiation therapy (IORT) may be initiated during the actual surgery. IORT is used to treat cancers that are difficult to remove during surgery or when there may be concerns that small amounts of cancer could remain. This will enable the patient to avoid coming back for multiple follow-up visits.

Another subset of patients may require radiation catheters which are placed around the tumor bed where the cancer used to be. After the patient recovers, supplemental radiation treatments can be delivered through the catheters.

Outcomes for IORT and breast cancer

Since 2019, 78 patients with early stage breast cancer were given IORT. Of these, only 11 needed additional radiation. Eighty-six percent had the IORT as their sole adjuvant radiation treatment. The only recurrence was in a patient who was advised to have supplemental whole breast radiation, but she refused. She recurred despite compliance with endocrine therapy.

An invitation to providers

Collectively, these new technologies deliver multiple benefits to cancer patients. We invite healthcare providers to tour our facilities, virtually or in-person. I'm also available to talk individually with any provider who wants to explore how these treatments can benefit their patients.

Dr. Houman Vaghefi, PhD, *is a board-certified radiation oncologist and the Director of the Radiation Oncology Program at Goshen Center for Cancer Care. He is an advocate for advanced internal and external therapies to deliver targeted radiation for patients with cancer in ways that reduce negative side effects and improve outcomes.*

Adaptive radiation therapy studied in patients with prostate cancer

James Wheeler, MD, PhD, presented the findings of a research study he completed with seven of his Colleagues at the American College of Radiation Oncology (ACRO) conference March 10. The other Colleagues were John Lowden; Fang Liu, PhD; Houman Vaghefi, MD, PhD; Irina Sparks, MD; Samantha Korda; Adam Moore; and Brayton Yoder.

The name of the presentation was "Initial Experience of Adaptive Radiation Therapy for Patients with Early-Stage Prostate Cancer Treated on the Ethos Unit."

Purpose of the study

The volume and configuration of the bladder and rectum change daily, and the dose-volume histogram analysis of the treatment plan obtained from the planning CT data set may not accurately reflect the actual doses received throughout the course of treatment.

The Ethos Unit allows cone beam CT imaging to be acquired and a new treatment plan generated daily for that day's treatment session. This study compares target coverage and normal tissue doses for the initial cohort of patients treated with this new technology.

Methodology

Nineteen patients with early-stage prostate cancer were given between 15 and 29 fractions of external beam radiation therapy. The prostate, seminal vesicles, bladder, rectum and other structures were auto-contoured daily and adjusted by the physician prior to planning and treatment. A "standard plan" incorporated the changes in organ contours but did not change the beam fluence derived from the treatment plan of the original CT simulation dataset. An "adaptive plan" then optimized the beam fluence according to the newly contoured structures.

This analysis compares the target coverage and organ sparing of the adaptive plan to the standard plan and original plan via the Wilcox signed rank test. The Holm procedure is used to adjust the multiplicity and control the overall Type-I error rate for each pairwise comparison.

Results

Substantial differences were seen not only in the bladder and rectal volumes, but also in the contoured volumes of the prostate, seminal vesicles and resultant PTV (planning target volume). The average absolute value of the difference between the prostate volume on the planning CT compared to the daily treatment was 19.7%. For the seminal vesicles it was 21.8%; for the PTV 10.8%; bladder 27.7%; and rectum 20.3%.

The Wilcox signed rank test for the adaptive versus scheduled treatments favored adaptive planning in terms of coverage to the prostate (Holm-adjusted p-value 0.0229), seminal vesicles (Holm-adjusted p-value 0.0010) and PTV (Holm-adjusted p-value <0.00005). The adaptive plan was favored versus the scheduled plan for bladderV70 per the raw p-value from the Wilcox signed rank test (p-value 0.0401) and rectumV40 (p-value 0.0181), but the statistically significant differences no longer exist with the Holm multiplicity adjustment (p-value 0.2809 for bladderV70 and p-value 0.1447 for rectumV40).

Conclusions

Adaptive planning provided significantly better coverage of the prostate, seminal vesicles and PTV compared to the scheduled plan. Contouring variability of the targets was significant, and its impact on the evaluation of plan quality is under investigation. There was no significant difference between the adaptive plan and the original plan in terms of target coverage or normal organ sparing.

James Wheeler, MD, PhD, *is a board certified radiation oncologist. He has extensive experience in the latest techniques for treating cancer and supports treating patients on clinical trials.*

Goshen Center for Cancer Care
200 High Park Ave.
Goshen, IN 46526

Benefits of targeted radiation therapy

What healthcare providers need to know

"In the past, radiation therapy involved a regimen of multiple applications over several weeks or months. In the right circumstances, however, we can now initiate a stereotactic treatment program that shortens the process dramatically. In some cases, this may mean as little as one treatment and seldom more than five treatment sessions. This shortening of the process helps minimize the potential for troubling side effects, reduces the cost of treatment and has demonstrably improved outcomes."

~ Dr. Houman Vaghefi

TO REFER A PATIENT

Goshen Center for Cancer Care provides holistic, complete care for patients. To refer a patient, call **(574) 364-2973** or visit **GoshenHealth.com/quick-guide**.

If you would like more information or to meet any of our doctors, please contact **Jenny Rupp, Physician Liaison, at jrupp2@goshenhealth.com** or **(574) 364-2978**.